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CONTRIBUTIONS TO JAPANESE ASCIDIAN FAUNA

XI. SPORADIC MEMORANDA (2)[1)]

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With Plates XI–XIV and 5 Text-figures

CONTENTS

1. Some Ascidians from the East China Sea.

(Pl. XI; Text-fig. 1)

I had a chance to examine a few specimens of tunicates which were trawled in the East China Sea during the oceanographical surveys carried out by members of the Seikai Regional Fisheries Research Laboratory. This small material contains the following 4 species.

Didemnum (*Didemnum*) *apersum* TOKIOKA
Syndiazona grandis OKA in "*Aphanibranchion*" state
Syndiazona chinensis n. sp.
Pyrosoma atlanticum atlanticum (PERON)

Before going further, I express my hearty thanks to Messrs. T. TSUJITA and H. YAMASHITA of the Seikai Regional Fisheries Research Laboratory, by whose courtesy I was able to get the chance to examine the material. Also I must record here that the present short note is one of the contributions from the Seikai Regional Fisheries Research Laboratory.

1. *Didemnum* (*Didemnum*) *apersum* TOKIOKA, 1953

(Pl. XI, Figs. F & G)

A small, 10 mm×8 mm in extent, white colony was found on a specimen of

1) Contributions from the Seto Marine Biological Laboratory, No. 254.

Edwardsia sp. It is ca. 1 mm in thickness. Surface echinate (Pl. XI, fig. F); finger-shaped protuberances rather small, less than 260 μ in length. Some depressions on the surface are coloured faintly grayish yellow. Spicules small, 22 μ in average diameter and up to 26 μ in larger ones; about 10 rays on the equatorial plane, rays rather short and bluntly pointed at the tip. They are distributed uniformly and densely throughout the colony. Average distance between zooids ca. 570μ. Zooid small; thorax ca. 400μ in a contracted state and has a fan-shaped thoracic tubercle at the dorso-posterior part on each side and a retractor muscle nearly as long as the contracted thorax, abdomen ca. 400μ in length. Gonad quite immature.

The present specimen conforms well to the type specimen in size and appearance of spicules, but differs in the following three points: ··· 1) finger-shaped protuberances on the colony surface are smaller, 2) spicules distributed uniformly and densely, and 3) zooids smaller in the present specimen.

Loc.: 27° 35–40′N×125° 01–16′E, 100 m. July 9, 1954.
Sp. No.: Asc. 56.

2. *Syndiazona grandis* OKA, 1926

One specimen in "*Aphanibranchion*" state. Corona roughly spherical, 50 mm ×30 mm in transverse section and ca. 50 mm in height. Peduncle thick and ca. 40 mm in length. The colony is dark brownish in colour; the surface is generally smooth, although a few irregular grooves are found there. Zooids are not in good condition, thorases being wholly lost. Stomach is situated evidently in the posterior half of the abdomen.

Loc.: 29° 08–12′N×126° 10–22′E, 93 m. July 10, 1954.
Sp. No.: Asc. 54.

3. *Syndiazona chinensis* n. sp.

(Pl. XI, Figs. A–E; Text-fig. 1)

A 120 mm×65 mm colony fastening the gravels and shell fragments at the underside. It is 15–25 mm in thickness, margin is very thin at some places. Test grayish brown in colour and translucent, zooids are seen through. Surface smooth and free from foreign matters.

Zooid: Yellowish brown in colour in preservation in formalin. Thorax up to 4.5 mm in length, abdomen 5–6 mm. A long vascular prolongation is issued from the posterior end of the abdomen; it is rather thick, yellowish brown in colour and may be long as much as 25–30 mm. Neck region extremely thin, of moderate length and coloured dark greenish.

Thorax: Both branchial and atrial apertures 6-lobed, with an orange ocellus at each interval between lobes; the atrial siphon is slightly longer than the branchial. About 10 longitudinal muscles on each side of the thorax besides ca. 8 short ones at the dorso-posterior side of the atrial siphon. Six to seven of the long muscles on the ventral side are running rather obliquely, with their posterior ends meeting the endostyle obliquely and being bifurcated in the posterior half of the thorax. The ventral half of thoracic muscles proceeds anteriorly towards the base of the branchial siphon, while the dorsal half reaches anteriorly to the base of the atrial siphon. Thus the area neighbouring the dorsal ganglion is quite free from muscles. Muscle fibres of thoracic muscles are, however, not continuous with those of siphonal muscles.

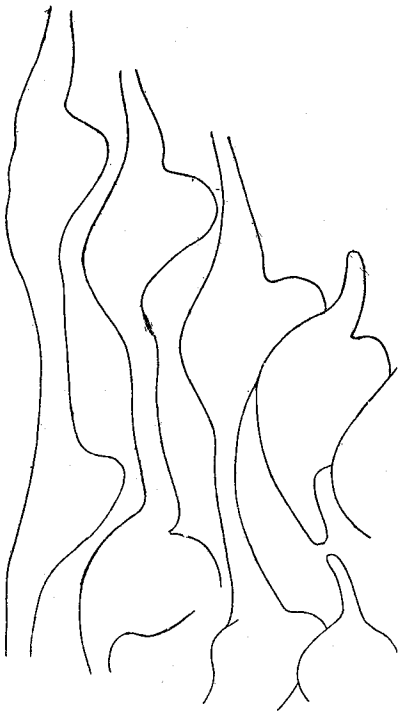

Fig. 1. *Syndiazona chinensis* n. sp. A part of the inner surface of the branchial sac, ×280.

Transverse muscles absent. There are about 10 transverse vessels on each side; they are rather thick and seem at a glance as if they were transverse muscles, although the microscopical examination easily reveals their haemal structure. Thirty to thirty-five stigmatal rows, dorsal languets slightly displaced to the left from the dorsal mid-line. Stigmata in a row numerous, transverse vessels are provided each with ca. 40 papillae which support each a thin inner longitudinal vessel (Fig. 1). Usually 1-2 stigmata in a mesh. Tentacles (Pl. XI, fig. D) very fine, comprise 6 large, 6 medium and 12 small ones which form another ring slightly in front of the ring consisting

of large and medium ones. Ciliated groove a short longitudinal slit (Pl. XI, fig. E). Anus bilobed and situated on the level of about the 10th transverse vessel.

Abdomen: Oesophagus short. Stomach situated in the anterior half of the abdomen and large, about 1/3 as long as the abdomen. The surface is smooth, but the longitudinal plications on the inner wall, ca. 30 in number, are seen through. Hind stomach and mid-intestinal region distinct; the latter rather long and constricted from the rectum near the posterior end of the abdomen. Gonad was not found in any zooid. All organs in the abdomen are completely embedded in the mesenchyme tissue. Posterior ends of several dorsal ones of thoracic longitudinal muscles are united into two muscular bands which run along a side of the abdomen and proceed into the posterior vascular prolongation.

Remarks: Encrusting appearance of colony, absence of transverse muscles and presence of ca. 10 well developed longitudinal muscles on each side of the thorax, much more (ca. 40) inner longitudinal vessels and the situation of the stomach in the anterior half of the abdomen are the characteristics of the present new species differentiating it from *S. grandis*.

Loc.: 29° 08–12′N×126° 10–22′E, 93 m. July 10, 1954.
Sp. No.: Type 152.

4. *Pyrosoma atlanticum atlanticum* (PERON), 1804

A 75 mm long colony; the anterior part ca. 10 mm and the posterior part 19 mm in width and rather compressed being ca. 8 mm in thickness. Two zooids were dissected; they were respectively provided with: ···

27 gill slits ····· 15 inner longitudinal vessels
ca. 25 gill slits ····· 14–15 inner longitudinal vessels } 9 dorsal languets.

Loc.: 33°28–32.5′N×129°05–11′E, 108–0 m. June 29, 1954.
Sp. No.: Asc. 55.

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2. A New Species of *Distaplia* (*D. coronata* n. sp.) from the Japanese Waters.

(Pl. XII; Text-fig. 2)

Prof. H. OKA of Tokyo University of Education sent me a colony of a compound ascidian which was grown on a submerged slide glass at Simoda Marine Biological Laboratory and fixed finely in formalin after cocainization. At a glance I found immediately that this ascidian should be a new form. And after careful examination, it is proved that this new form belongs to the genus *Distaplia*. The colony is attached to the slide glass by wide and flat creeping stolons assuming the form of a complex configuration as shown in Pl. XII fig. A. It contains merely a cormidium which consists of the corona, 7 mm in diameter and 5 mm high, and the peduncle 4 mm in diameter and 3.5 mm in height. The corona comprises a single system which is composed of a dozen zooids surrounding a common cloacal aperture at the centre and situated perpendicularly with their ventral sides towards the periphery. The margin of the common cloacal aperture is divided into about 10 lobules. The peripheral margin of the upper surface of the corona is provided with a dozen languets-like protuberances placed one at the ventral mid-line of each zooid. Corona contains thorases of zooids and the distal half of the peduncle contains abdomens. The colony of the paratype which was also grown on the slide glass at Simoda, fixed on Sept. 6, 1952 and preserved in the Zoological Institute of Tokyo University of Education has 5 cormidia consisting respectively of 6, 7, 12, 12 and 13 zooids. Both the type and the paratype are practically colourless throughout the whole colony in preservation in formalin, only faintly tinted grayish green at zooids. The corona nearly transparent, while the peduncle and stolons are translucent. A greenish mass is found in the stolon of the type specimen. Mr. H. WATANABE of Tokyo University of Education sent me kindly a sketch of this ascidian coloured carefully as in its living state. This sketch was made on Nov. 9, 1954 at Simoda Marine Biological Laboratory and shows the following colouration: ··· The upper surface of the corona faintly yellowish and sprincled sparsely with pinkish dots. The yellow pigments are found along the tentacular ring and especially densely around the dorsal ganglion. The lateral side of the corona is faintly brownish and dotted with pinkish, yellowish and whitish pigment spots, the last ones of which are found densely on the branchial lobes. The peduncle is pinkish as a whole and sprinkled with white spots.

Zooid: Thorax up to 3.4 mm and abdomen 2.3 mm in length. Neck region narrowed considerably. A pair of vascular prolongations are protruded from the left side of the intestinal loop, where the heart is situated. The area near the apex of the testicular mass seems to be prolonged also in a form of the vascular canal, although I could not trace this structure completely, because it was torn in every examined zooid. The incubatory pouch was not found in any zooid.

Thorax: Branchial aperture 6-lobed; the dorsal-most lobe is small, while the ventral-most one is much larger than others. Atrial aperture a huge opening and with a large atrial languet at the anterior end, the tip of which is simply acute or trifid as shown in Pl. XII fig. D. Twenty-five to thirty muscles on each side of the thorax; muscles in the anterior half are nearly transverse, while those in the posterior half are quite oblique. The neighbourhood of the dorsal ganglion is devoid of muscles. Muscles around the branchial aperture are all circular. A pair of the longitudinal muscles are running along the dorsal mid-line of the branchial sac and proceed posteriorly onto the left side of the abdomen and finally enter the vascular prolongations one in each of the two appendages; this musculature seems to play as the retractor in this form. Stigmata in each of 4 rows are as follows:

1st row	20–22	3rd row	18–19
2nd row	20	4th row	15–17

The ventral-most stigma in each row is much smaller than others. Stigmata of the first and the fourth rows diminish the length ventrally. Parastigmatic vessels distinct. Dorsal languets remarkable and displaced to the left from the dorsal mid-line. Tentacles 12, large and small ones alternate regularly. Ciliated groove is a roundish orifice.

Abdomen: Stomach is roughly elliptical in shape, not so large as in *Dist. dubia* (OKA) and provided with ca. 16 longitudinal plications on the right side, plications on the left side are rather irregular. Hind-stomach is not differentiated superficially, although this portion can be distinguished from the stomach proper by the complete absence of longitudinal plications. Mid-intestinal region is also indistinct, but it is discernible clearly when the preparation of the intestinal loop is examined in the light field under the microscope. This part occupies the posterior end of the intestinal loop. Anus bilobed and situated on the level of the 3rd transverse vessel. Testis situated on the right posterior side of the intestinal loop, its posterior half being protruded posteriorly out of the abdomen. Follicles generally 8 in number, each elongate in form and may rarely be branched. Ovary not found in any zooid.

Larva: Five well developed embryos were measured. Trunk elliptical, 1.29–1.45 mm (1.38 mm on average) in length, width/length 0.49–0.59 (0.55 on average). Three cup-shaped attachment processes arranged in a triangle. The ventral-most process has two bulbiform swellings at the base, while others are provided each with only one bulb. There is a considerably wide space between the bases of the attachment processes and the zooid which is situated slightly posterior to the middle of the trunk and vertically. Two pigment flecks of the sensory organ situated dorso-ventrally. Anus situated slightly on the left side and the dorsal ganglion and the sensory organ are displaced slightly to the right from the dorsal mid-line. Larval test frothy.

Remarks: The corona-like cormidium consisting of a single system and nearly

transparent appearance of the colony are the most striking characteristics of the present new species. The thorax comparatively larger than in other species and thoracic muscles running transversely or obliquely can be also accepted as characteristics of the new species. Larva is narrower than in *Dist. dubia*, in which width /length is 0.67 in an examined specimen (1.2 mm long). In larva of *Dist. dubia*,

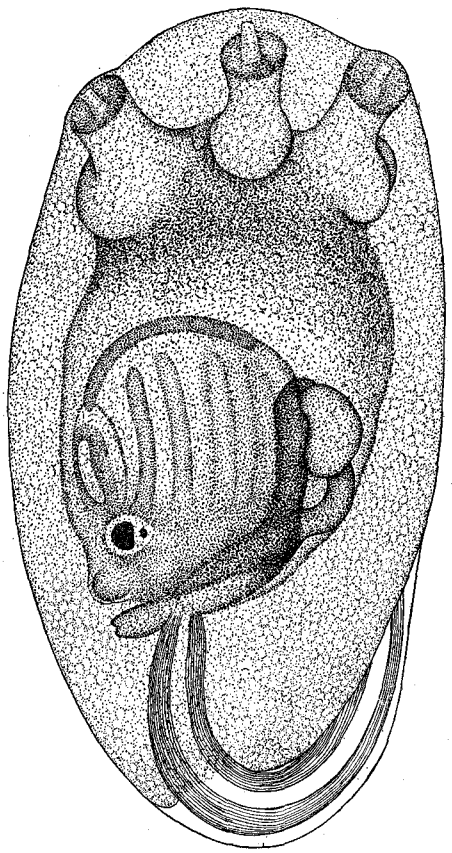


Fig. 2. *Distaplia coronata* n. sp.
Embryo from right side, ×73.

each attachment process has two bulbiform basal swellings. The situation of the zooid in the trunk of the larva in this new species closely resembles that in *Dist.* sp. aff. *dubia* described in "Ascidians of Sagami Bay (p. 207, Pl. X figs. 5–7)".

Lastly I wish to express here my hearty thanks to Prof. H. OKA and Mr. H. WATANABE for their kindness in offering me precious materials.

Sp. No.: Type 153.

3. Atrial Tentacles of *Styela clava* HERDMAN.

(Text-fig. 3)

I was obliged to re-examine closely some specimens of *Styela clava* HERDMAN when I was consulting about the identity of this species with *Styela mammiculata* CARLISLE recently reported by the author of the species from Plymouth Sound. On this problem I came to the conclusion that both species are quite identical with each other. Besides I found at the first time that the atrial tentacles of *St. clava* are very peculiar in their arrangement. Tentacles are fine and very numerous; they are arranged densely in two rows as shown in Fig. 3.

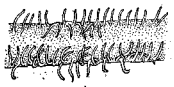


Fig. 3. *Styela clava* HERDMAN. Atrial tentacles, magnified.

4. Ascidians Fouling the Pearl Oysters in the Arafura Sea.

(Pls. XIII & XIV; Text-figs. 4–5)

I had a chance to examine a few ascidians which were taken up by members of the Tôkai Regional Fisheries Research Laboratory as remarkable fouling animals of the pearl oyster, *Pteria (Pinctada) maxima* (JAMESON), in the Arafura Sea. They consist of:

Polycarpa longiformis TOKIOKA ····· 1 individual
Microcosmus helleri HERDMAN ····· 2 individuals

Besides, I found small colonies or individuals of the following three species attached to the surface of *Microcosmus*.

Didemnum (Didemnum) moseleyi (HERDMAN)
Polyandrocarpa (Eusynstyela) latericius (SLUITER)
Styela partita (STIMPSON)

In the following, I wish to give some notes on these species. Before going further, I express here my hearty thanks to Messrs. TAKEMURA and OKUTANI for their kindness in giving me the chance to examine the specimens.

1. *Didemnum (Didemnum) moseleyi* (HERDMAN), 1886

(Pl. XIV, Figs. R–S)

More than 10 small whitish colonies, the largest one of which is 10 mm×6 mm in extent. They are all less than 1 mm in thickness. Spicules usually less than 49μ in diameter (57μ in the maximum diameter); rays of moderate length, bluntly pointed at the tip and 8–9 in number on the equatorial plane. Spicules are distributed densely and evenly throughout the colony from the surface to the bottom. The surface shows partially a sort of the granulated appearance. Average distance between zooids is

510μ. Thorases are all contracted strongly, 260–310μ (280μ on average) in length in a contracted state; abdomen ca. 400μ in length. The length of retractile muscles 44–121% of that of the contracted thorax, being 72% on average. Testicular follicle 1. The proximal portion of vas deferens coils 5 times in an examined zooid. Trunk of larva 550μ in length, width/length 0.63. Two sensory pigment flecks arranged antero-posteriorly.

Sp. No.: Rare 167.

2. *Polyandrocarpa (Eusynstyela) latericius* (SLUITER), 1904

(Pl. XIII, Figs. F & G)

A small colony, 15 mm long and 1 mm thick; zooids less than 4.5 mm in length. Both apertures respectively subterminal. Common test purplish, test covering the zooid is yellowish white with a large reddish orange pigment fleck on each lateral side. The dome-like swelling around each aperture has 4 thick reddish orange colour bands radiating from the aperture, the branchal aperture issues besides 4 thinner bands of the same colour. Mantle thin, about a dozen small elongate endocarps on each side of the inner surface. Atrial tentacles could not be detected on the present strongly contracted specimen. About 12 regular stigmatal rows and 1–3 irregular ones, inner longitudinal vessels are arranged for instance D 0 (7) 0 (4) 1 (7) 1 (5) 1 V on the left side in an examined zooid. Parastigmatic vessels are found on anterior large stigmata. Stigmata in a mesh less than 5. Tentacles 11 in an examined individual, consist of large and small ones. Ciliated groove (Pl. XIII fig. G) a longitudinal slit. The anterior end of the intestinal loop reaches two-thirds of the body length in a slightly contracted state. The cardiac end of the stomach situated near the posterior margin of the branchial sac and the pyloric end situated near the middle of the body. Fourteen to fifteen longitudinal plications on the stomach, pyloric coecum large and distinct. Anus opens near the opening of the oesophagus at the posterior end of the branchial sac and plainly margined. Gonad not yet formed.

Sp. No.: Rare 165.

3. *Polycarpa longiformis* TOKIOKA, 1952

(Pl. XIII, Figs. H & I; Text-fig. 4)

Body elongate and attached to the substratum by the posterior end, 53 mm in length excluding siphons of considerable length and 17 mm wide; it is compressed laterally and 7 mm in thickness. The atrial siphon longer than the branchial. Both apertures are 4-lobed. Test grayish white in colour, hard cartilaginous in consistency and ca. 2 mm in thickness, considerably thicker in the posterior portion; the inner surface whitish. The surface naturally smooth and free from foreign matters,

although a few irregular faint grooves are produced by contraction. Mantle delicate and pale yellowish brown in colour. Endocarps small and rather numerous, those in the posterior third and along the side of the endostyle in the posterior half of the body on the left side are larger than others. On the right side, larger endocarps occupy the ventro-posterior part of the body. Atrial velum indiscernible. Branchial sac and alimentary canal are completely eviscerated. Tentacles ca. 40 excluding minute ones, comprise large and small ones. Ciliated groove ↄ-shaped with both terminals curled in. Seventeen gonads on the right and 21 ones on the left, besides 11 gonads were found in the mantle sac being quite detached from the wall. Gonads are 2–2.2 mm in length in larger ones.

Sp. No.: Rare 164.

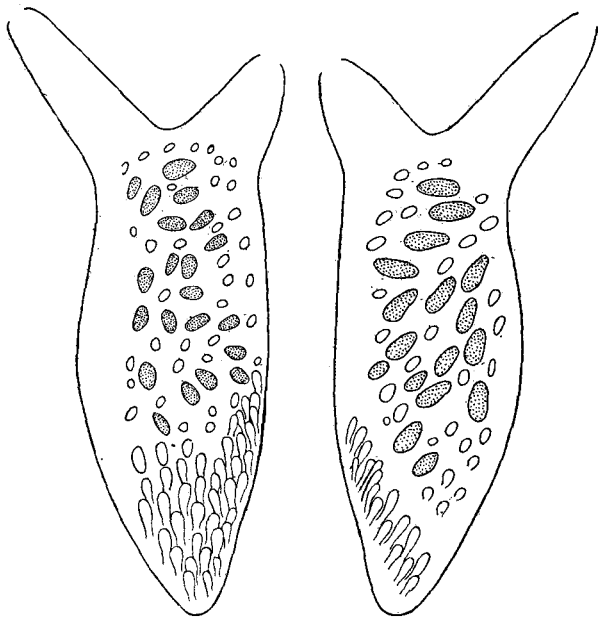


Fig. 4. *Polycarpa longiformis* TOKIOKA.

Left ··· Left half of mantle body, from inside.
Right ··· Right half of mantle body, from inside.

4. *Styela partita* (STIMPSON), 1852

(Pl. XIII, Figs. J & K; Pl. XIV, Fig. Q; Text-fig. 5)

A 9 mm long × 6 mm wide specimen attached to the test of *Microcosmus* by its whole left side. The body is roughly oval in shape, branchial aperture subterminal and atrial aperture situated near it, both apertures are sessile and 4-lobed. Test leathery, yellowish brown in colour, with a reddish orange tint in a considerably wide

area surrounding the apertures. This colouration is seen through on the inner surface of the test. The surface is wrinkled irregularly in preservation, test on the left attachment surface extremely thin. Mantle whitish yellow, extremely delicate and is provided with a number of endocarps on the inner surface. Fine tentacles (Pl. XIV fig. Q) found densely on the atrial velum.

Branchial sac: Inner longitudinal vessels are arranged:
Left D. 3 (11) 4 (7) 3 (13) 3 (7) 2 V.
Right D. 6 (11) 3 (11) 3 (11) 1 (6) 1 V.

Transverse vessels arranged ··· thick *p* thin *p* thick ··· where *p* represents the parastigmatic vessels. Stigmata very long, 2–3 ones in a mesh. Tentacles less than 20? Ciliated groove simply U-shaped.

Alimentary system: The axis of the second intestinal loop passes far in front of the cardiac end of the stomach which is elliptical in shape, longer than a half of the ventral branch of the first intestinal loop and provided with ca. 15 longitudinal plications on the right surface and an indistinct swelling at the pyloric end. Seven endocarps in the first intestinal loop. Anal margin with ca. 15 lobules. Gonad not yet developed.

Remarks: This specimen may be accepted safely as an immature *St. partita*, because the arrangement of the alimentary canal resembles closely that of the typical individuals of that species. The swollen appearance of the intestine is probably an unnatural deformation.

Sp. No.: Rare 166.

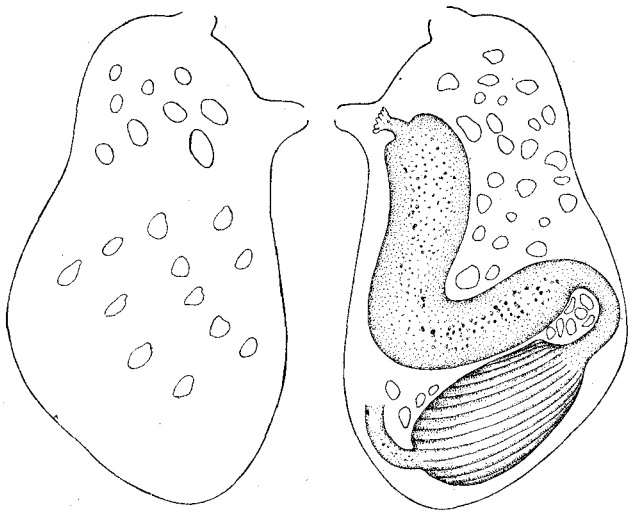


Fig. 5. *Styela partita* (STIMPSON).
Left ··· Right half of mantle body, from inside.
Right ··· Left half of mantle body, from inside.

5. *Microcosmus helleri* HERDMAN, 1881

(Pl. XIII, Figs. A–E; Pl. XIV, Figs. L–P)

The body roughly oval in shape and compressed laterally, with protruded short siphons and attached to the substratum by the posterior end of the body or by the prolongation of the test at the rear end of the body. The animals lie with their right or left sides beneath. Branchial siphon terminal or subterminal, the anterior base of atrial siphon at the middle of the body. Two specimens respectively 67 mm (long) × 40 mm (wide) × 24 mm (thick) and 68 mm (l) × 45 mm (w) × 23 mm (t) in measurement. Test hard leathery, ca. 2 mm in thickness and whitish yellow to yellowish brown in colour; the inner surface pearly whitish and glistening. The surface is irregularly wrinkled and with hydrozoans, didemnids and other small solitary ascidians adhered there. The test is penetrated by bivalves, *Musculus* sp., especially remarkably around the apertures. Mantle whitish yellow and of moderate thickness. No endocarps on the inner surface of the mantle. There are fine tentacle-like protuberances (ca. 180μ in length) on the inner surface of the distal part of siphons.

A 6 mm long individual found on the larger specimen (Pl. XIII fig. D) nearly elliptical in outline and attached to the test by the ventral side slightly inclined to the left side. Test milky white with slight purplish hue and produces several outgrowths from the periphery. Branchial aperture terminal and the atrial subterminal, both apertures nearly sessile. Mantle whitish and translucent. In a 2.5 mm long individual, test milky white in colour and with a few reddish orange spots on the dorsal side, mantle yellowish white; branchial aperture near the terminal end and the anterior base of the atrial siphon at the middle of the body, both siphons of a considerable length.

Branchial sac: Six folds on each side, although the ventral-most one (VI) in the 2.5 mm long individual is indistinct.

68 mm long individual:

Left D. 4 (44) 2 (30) 3 (33) 4 (29) 4 (22) 3 (17) 1 V

Right D. 4 (38) 2 (29) 4 (32) 3 (29) 4 (25) 4 (23) 1 V.

67 mm long individual:

Left D. 3 (34) 3 (27) 4 (25) 4 (24) 3 (20) 2 (16) 1 V.

Right D. 3 (33) 1 (26) 3 (28) 2 (26) 4 (22) 3 (20) 1 V.

6 mm long individual:

Right D. 1 (11) 0 (8) 0 (11) 0 (11) 1 (9) 0 (7) 0 V.

Transverse vessels arranged as ··· 133323331 ··· in the order of the thickness and with parastigmatic vessels in large specimens, while as ··· 1 p 2 p 1 ··· in the 6 mm long individual, here p represents parastigmatic vessels. Usually 6–8 stigmata (15 in the maximum) in a mesh in larger specimens. Tentacles in large specimens 13–16, larger and smaller ones situated roughly alternately, besides minute ones at some intervals;

branches in 4 orders. In the 6 mm long individual they are ca. 10 comprising large and small ones; branches in 2 orders. Ciliated groove simple U-shaped in smaller specimens.

Alimentary system: The anterior margin of the intestinal loop reaches near the base of the branchial siphon. Several endocarps along the anterior end of the loop, besides one or two are found at other parts of the loop in larger specimens. Liver brown, yellowish brown, yellowish or even whitish in some parts.

Gonad: Two (in larger specimens)–three (6 mm long specimen) genital capsules on the right and 3 on the left side. No capsule developed in the 2.5 mm long individual. Capsules colourless to grayish brown.

Sp. No.: Rare 163.

EXPLANATION OF PLATES XI–XIV

PLATE XI

Figs. A–E. *Syndiazona chinensis* n. sp.

A ··· Zooid, ×3.3.

B ··· Thorax, right side; enlarged.

C ··· Abdomen, enlarged.

D ··· A part of tentacular rings, magnified.

E ··· Dorsal tubercle, magnified.

Figs. F–G. *Didemnum* (*Didemnum*) *apersum* TOKIOKA.

F ··· A part of the colony surface, ×23.

G ··· Calcareous spicules, ×630.

PLATE XII

Figs. A–D. *Distaplia coronata* n. sp.

A ··· Type colony, enlarged.

B ··· Zooid, right side, ×23. Thoracic muscles are shown in detail.

C ··· Zooid, left side, ×23. Thoracic muscles omitted from the figuer.

D ··· Tip of a trifid atrial languet, magnified.

PLATE XIII

Figs. A–E. *Microcosmus helleri* HERDMAN.

A ··· 68 mm long individual, left side.

B, C ··· Ciliated grooves of 68 and 67 mm long individuals, enlarged.

D ··· 6 mm long individual.

E ··· Ciliated groove of 6 mm long individual.

Figs. F–G. *Polyandrocarpa* (*Eusynstyela*) *latericius* (SLUITER).

F ··· A zooid, dorsal; enlarged.

G ··· Ciliated groove, magnified.

Figs. H–I. *Polycarpa longiformis* TOKIOKA.

H ··· 53 mm long individual, right side.

I ··· Ciliated groove, enlarged.

Figs. J–K. *Styela partita* (STIMPSON).

J ··· 9 mm long individual.

K ··· Ciliated groove, magnified.

PLATE XIV

Figs. L–P. *Microcosmus helleri* HERDMAN.

L ··· Right half of mantle body of 68 mm long individual, from inside.

M ··· Left half of the same individual, from inside.

N ··· Tentacle-like protuberances on the inner surface at the distal part of siphons, ×73.

O ··· Right half of mantle body of 6 mm long individual, from inside.

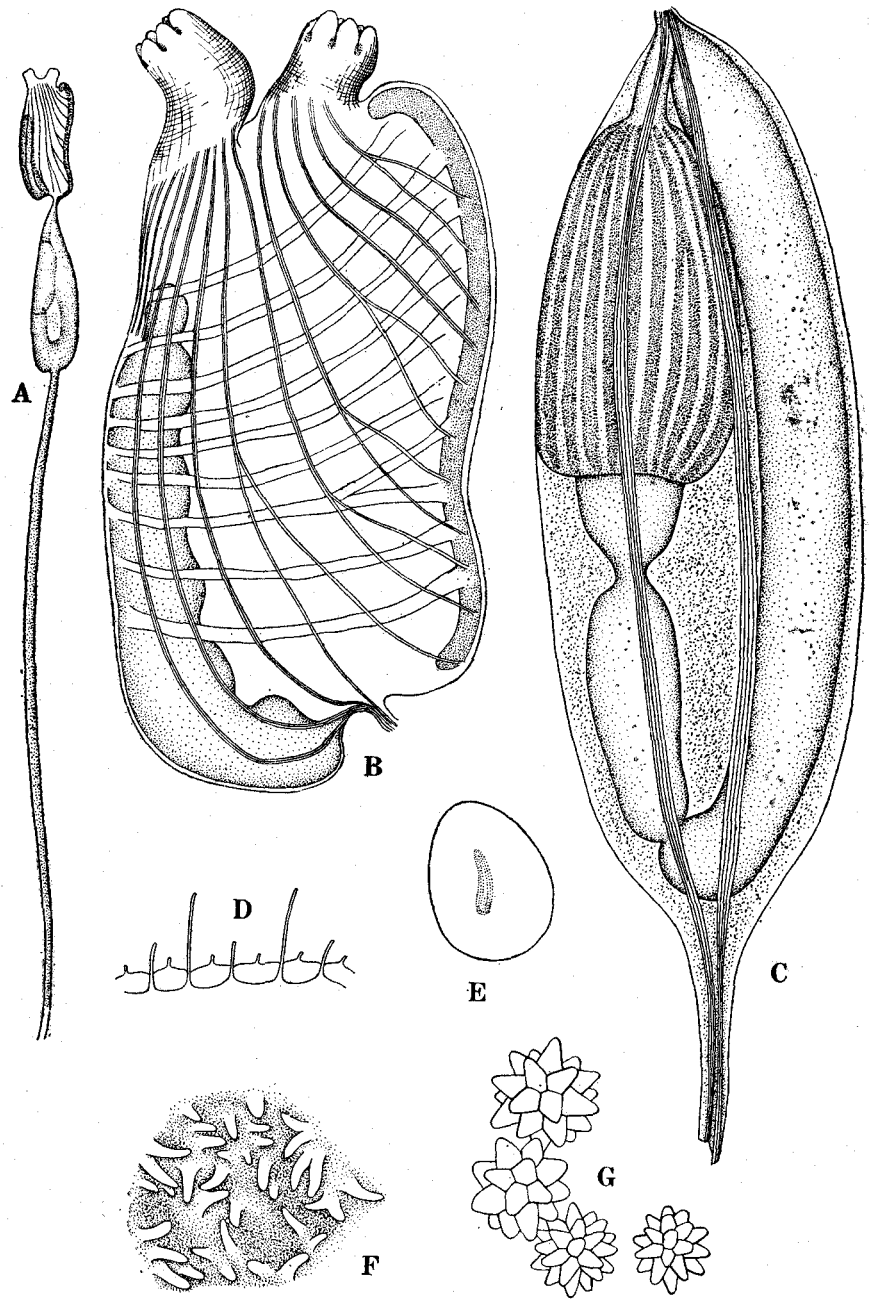
P ··· Left half of the same individual, from inside.

Fig. Q. *Styela partita* (STIMPSON), atrial tentacles, ×73.

Figs. R–S. *Didemnum* (*Didemnum*) *moseleyi* (HERDMAN).

R ··· Calcareous spicules, ×630.

S ··· Embryo from right side, ×73.



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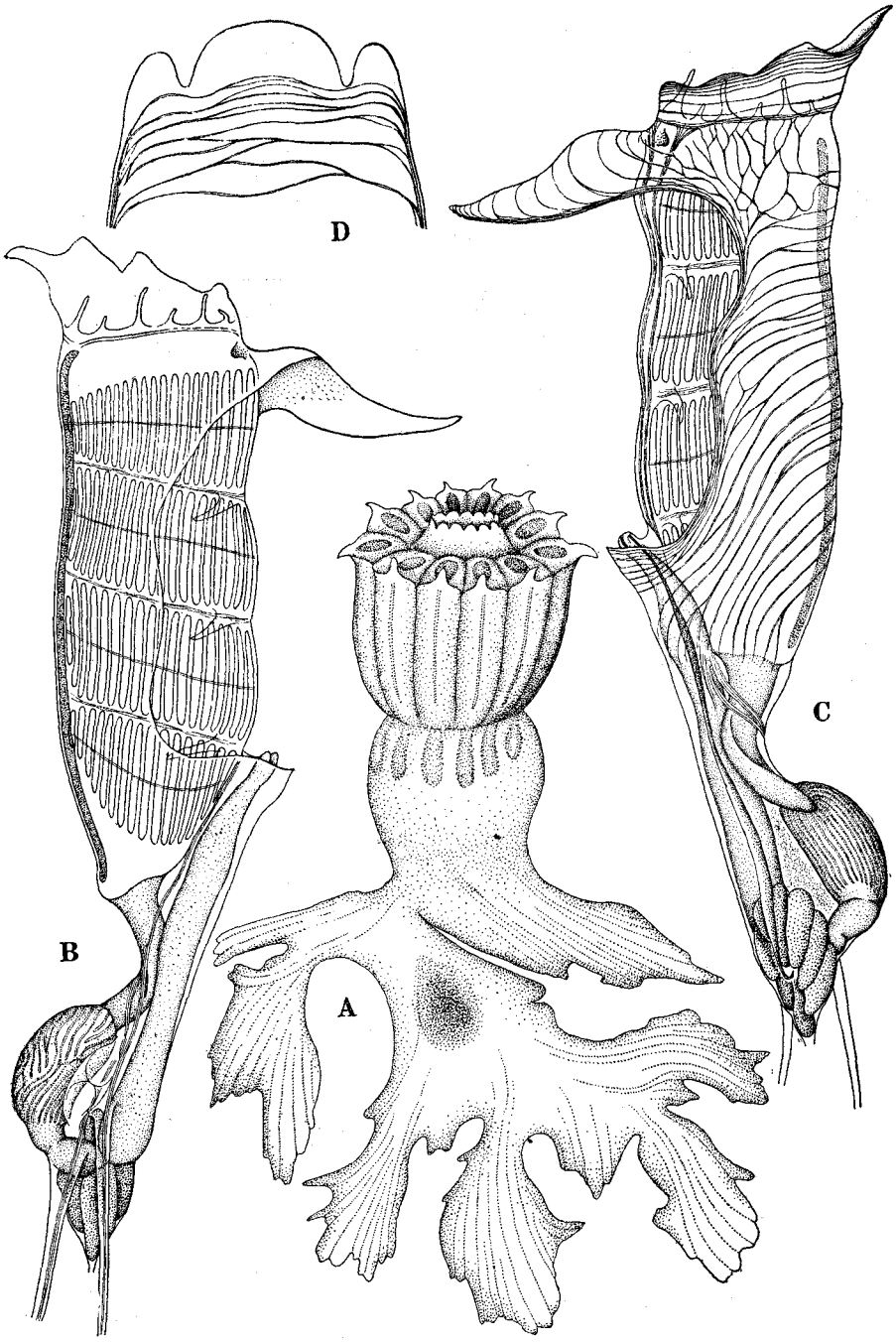

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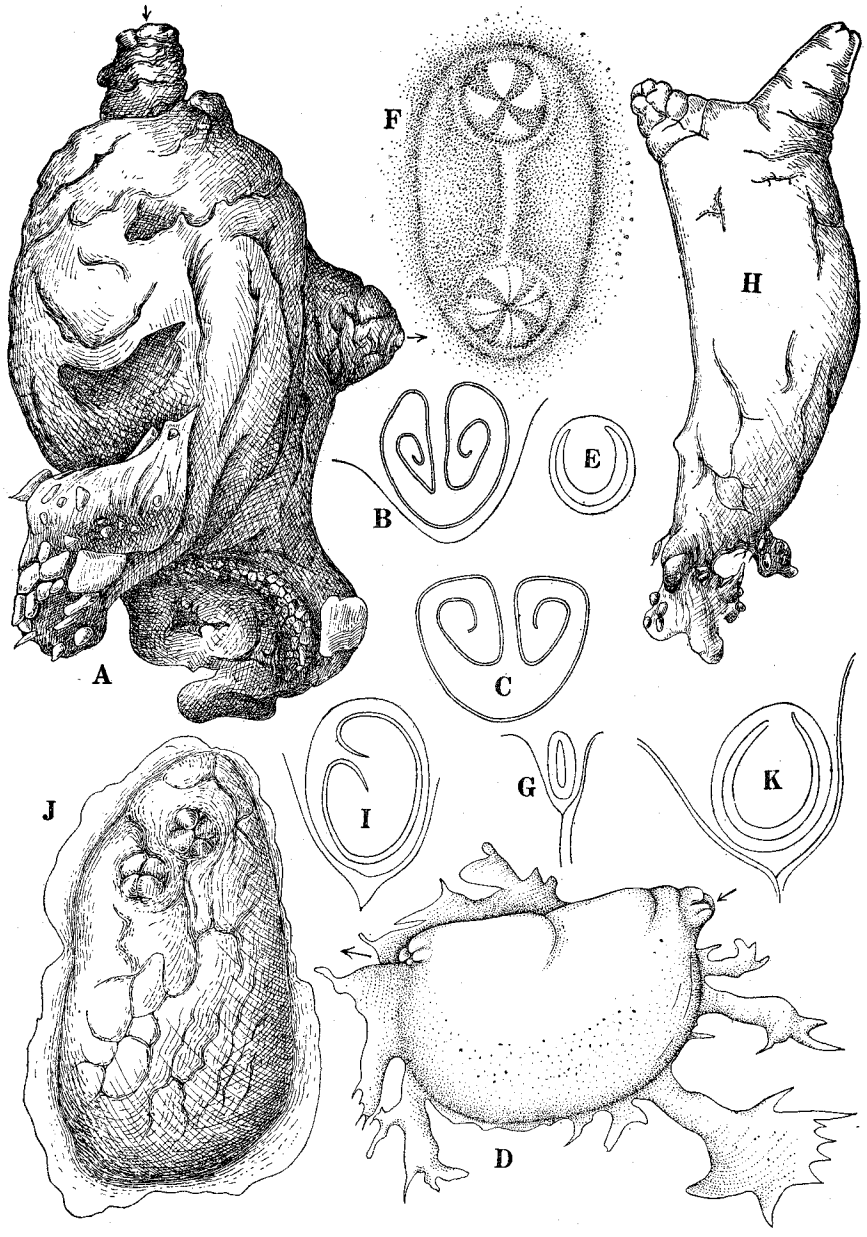

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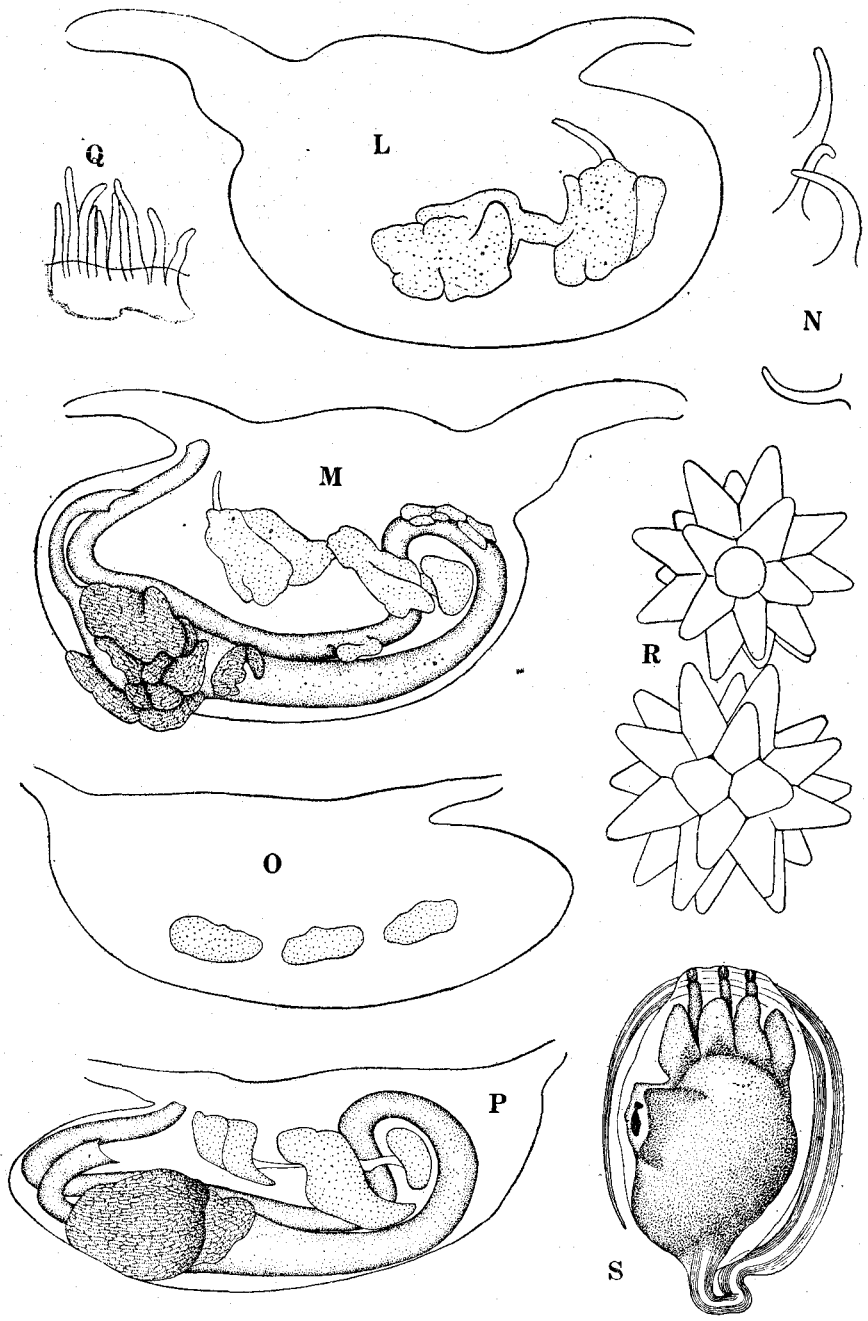

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